

Echinacea Roots: Premium Immune Modulation

Echinacea is probably the most widely used herbal medicine in the English-speaking world. Three species of Echinacea, commonly known as purple coneflower, are used medicinally: *Echinacea angustifolia*, *E. purpurea* and *E. pallida*. Flowering tops, aerial parts, root and whole plant are used. The root is the most active part.

Echinacea purpurea has become the most cultivated and used of the various species in recent years because it is more easily cultivated. *Echinacea pallida* is considered to be the least effective of the three species.

Traditional Use

Information about the use of Echinacea first came from American Native tribes. *Echinacea angustifolia* was used, according to one historian, as a "remedy for more ailments than any other plant". The root was used for toothache, sore throat, fits, stomach cramps, septic conditions, rabies and as a universal antidote for snakebite and other venomous bites, stings and poisonous conditions. Echinacea root has been used topically, especially for skin conditions and enlarged glands.¹

The Eclectics, a group of practitioners who were prominent around the late 19th and early 20th centuries in the United States, adopted the Native Americans' use of Echinacea. By 1921 Echinacea was by far the most popular treatment prescribed by Eclectic physicians for a wide range of conditions, mainly infections and envenomations of various kinds, which clearly attest to Echinacea's influence on the immune system. They were not averse to using Echinacea long-term, or for chronic disorders (including cancer, tuberculosis, chronic ulceration, chronic glandular indurations) or conditions suggestive of autoimmunity (diabetes, exophthalmic goitre, psoriasis). In the traditional texts *E. angustifolia* is more often cited than *E. purpurea* with predominant use of the root as the preferred plant part.

Medicinal use of the fresh flowering plant originated in Germany in the late 1930s where it was popularised by Dr Gerhard Madaus. Madaus was influenced by the homoeopathic use of whole plant tinctures. He imported seed from America which subsequently turned out to be *Echinacea purpurea* seed. Hence the popularity and

proliferation of European research on *E. purpurea*, especially preparations made from the flowering tops.

Active Constituents

The three major groups of active constituents occurring in Echinacea are the caffeic acid derivatives, polysaccharides and the lipophilic components (mainly alkylamides and polyacetylenes). The alkylamides cause a characteristic tingling in the mouth. The level of certain active constituents can vary markedly (even being reduced to zero) depending upon the time of harvest and the quality of postharvest handling (especially drying).

The root contains:

- alkylamides: present in *E. angustifolia* (0.3–1.2%) and *E. purpurea* (0.3–0.8%) and largely absent from *E. pallida*;
- caffeic acid esters including echinacoside (0.4–1.0% in *E. angustifolia*, not present in *E. purpurea*), cichoric acid (significant quantities in *E. purpurea* only: 0.7–1.5%) and cynarin (in *E. angustifolia* only).

The aerial parts contain alkylamides in smaller quantities than in the roots (0.01–0.03% in *E. purpurea*). The main caffeic acid ester present in *E. purpurea* flowering tops is cichoric acid (0.7–2.5%).

Scientific Studies

Despite its popularity, the scientific understanding of how Echinacea works is incomplete. What useful evidence there is suggests that Echinacea mainly stimulates phagocytosis, ie it acts mainly on the non-specific immune response.

Oral administration of *Echinacea purpurea* root tincture to healthy volunteers for 5 days increased the phagocytic activity of granulocytes in a placebo-controlled trial. Phagocytic activity was maximally stimulated by the fifth day and remained well above normal for a few days after Echinacea was stopped, indicating a residual stimulating effect, before it returned to normal.²

A formula containing both *E. angustifolia* root and *E. purpurea* root prevented the common cold in highly stressed medical students in a randomised, double-blind,

placebo-controlled trial lasting 15 weeks. By the seventh week of treatment the Echinacea group had a lower frequency of colds than the placebo group, and by the tenth week the difference was statistically significant. The daily dose of the formula was equivalent to 3.5 g dry weight of Echinacea root.³

Pharmacological studies have indicated that a single constituent is not responsible for the activity and many constituents including alkylamides, cichoric acid, polysaccharides and glycoproteins may contribute. Alkylamides are widely regarded to be the most active constituents.⁴ Considerable immunological activity has been observed for Echinacea: enhancement of phagocytosis *in vitro* (granulocyte smear test) and *in vivo* (carbon clearance test, oral route). In these experimental models: *E. purpurea* root was the most active root extract; lipophilic fractions from root extracts were more active than hydrophilic fractions; extracts of the aerial parts demonstrated lower activity than that of the roots (perhaps due to lower alkylamide levels); an enriched alkylamide fraction from *E. angustifolia* and *E. purpurea* roots as well as cichoric acid had activity *in vivo*. The lipophilic fraction contained alkylamides, polyacetylenes and essential oil and the hydrophilic fraction contained caffeic acid derivatives.

Traditional ethanolic extracts of Echinacea do not rely on polysaccharides for their activity (in fact these extracts probably contain insignificant amounts of polysaccharides).⁴

When to Use Echinacea Root

Echinacea root contains the highest levels of the immune stimulating alkylamides so Echinacea root preparations should be used when strong immune modulating activity is required. Such indications would include:

- Prophylaxis and treatment of infectious conditions such as influenza, colds and septic processes, **particularly those of a chronic or recurrent nature.**
- Treatment of **allergies**, mild septicaemia, skin disorders such as psoriasis.
- To alleviate temporary weakness of the body's defences; to reduce the immune depletion caused by chemotherapy.
- States of weakened or suppressed immunity such as post-viral syndromes.
- Autoimmune diseases.

Cautions and Contraindications

There is no conclusive evidence that it is detrimental to use Echinacea for long periods, or that it is contraindicated in disorders such as autoimmune diseases, allergies and asthma.

The risk of allergic reaction to Echinacea itself is very small, especially if the root is used (these preparations are free of pollens).

Use of Echinacea by pregnant women during organogenesis was not associated with an increased risk for major malformations in a recent, prospective, controlled study. There were no significant differences in pregnancy outcome between the study group and their matched controls.⁵

REFERENCES

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